ORIGINAL RESEARCH

# Psychometric Properties of the Multidimensional Scale of Perceived Social Support (MSPSS) Among Family Caregivers of People with Schizophrenia in China

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**Introduction:** The Multidimensional Scale of Perceived Social Support (MSPSS) is one of the most widely used scales for social support. Although previous studies have shown good reliability and concurrent validity, conflicting evidence exists on its factor structures.

**Aim:** To validate the MSPSS among caregivers of people with schizophrenia in China and assess its factor structure.

**Methods:** A cross-sectional study was conducted of 449 family caregivers in 12 communities for psychometric testing, eg, internal consistency reliability, test–retest reliability, construct validity, exploratory factor analysis (EFA) and confirmatory factor analysis (CFA).

**Results:** The MSPSS showed good internal consistency with a Cronbach's alpha of 0.95, good test–retest reliability with intraclass correlation coefficient (ICC) of 0.91, and kappa ranging from 0.62 to 0.71. Concurrent validity was supported by its negative correlations with perceived stress, and significant positive correlations with caregiving rewarding feelings, family functioning, and coping. EFA yielded a two-factor structure (family vs non-family), while CFA generally supported a three-factor structure (family, friends, and significant others).

**Conclusion:** Our findings show good psychometric properties of the MSPSS among caregivers of people with schizophrenia in China. EFA yields two-factor structure and CFA yields three factors consistent with the theory underlying the measure's development.

**Keywords:** Multidimensional Scale of Perceived Social Support, reliability, validity, factor analysis, Chinese

## Plain Language Summary

**What is already known about the topic?**

- Social support comes from three different sources: family, friends, and significant others.
- The MSPSS showed good reliability and factorial validity among diverse samples in the original psychometric study.

**What this paper adds**

- MSPSS shows good psychometric properties among caregivers of people with schizophrenia in China.

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- This paper demonstrates that a two-factor structure of MSPSS is family and non-family support.

## Introduction

Social support is a useful multidimensional resource to help people with positive strategies when confronting adversity and stress.[1] Social support usually comes from various sources such as family, friends and other social relationships. Abundant evidence has shown positive impacts of social support upon self-efficacy, job commitment, marital satisfaction, coping style and family function.[2,3] Additionally, social support has buffering effects against fatigue, depression, insomnia, suicidal intention.[4,5]

Given the relationship of social support to health, a psychometrically sound measurement tool is needed to guide interventions and evaluation. The Multidimensional Scale of Perceived Social Support (MSPSS) is one of the most widely used instruments to assess social support.[6] It contains 12 items assessing support from three sources: family, friends and significant others. Since its development by Zimet et al in 1988,[7] the MSPSS has been translated into various versions and validated among various populations.[8–10] These studies generally reported high reliability of MSPSS, with Cronbach's alpha≥0.90; as well as good concurrent validity, with significant associations with other health indicators such as coping,[11] loneliness[12] and stress.[13]

Although past studies consistently reported good reliability and validity of the MSPSS, conflicting evidence exists on its factor structure. While most studies using confirmatory factor analysis (CFA) generally supported the three-factor structure (family, friends and significant others);[14–16] some studies using exploratory factor analysis (EFA) showing different factor structures. For instance, Tonsing et al[13] validated the Urdu version of MSPSS among a sample of Pakistani and Nepalese respondents living in Hong Kong and found a two-factor structure. While the original Friends subscale was retained as one factor, the remaining items of the original domains of Family and Significant Others all loaded on to a single factor, suggesting a broader family factor. Similar two-factor structures were also reported with caregivers of patients with cancer in Zimbabwe,[17] public secondary school teachers in Peninsular Malaysia[18] and adult stroke survivors in Nigeria.[19] A single-factor solution for the MSPSS has been found using principal components factor analysis of EFA among a South

Asian population.[20] This suggests that the factor structure may be both sample- and method-dependent.[21]

The MSPSS was first translated into Chinese by Huang et al in 1996 and has since been validated with various populations.[22–24] However, the psychometric properties of MSPSS have not yet to be tested among caregivers of people living with schizophrenia.

Caring for a family member with schizophrenia imposes a significant burden on family caregivers,[25] who have undergone a broad spectrum of problems including physical burnout, economic pressure and psychological distress.[26] Numerous studies have demonstrated that caregivers of people with schizophrenia are socially isolated and lack social support,[27–29] which further aggravates caregiver burden and psychological distress.[30] It is thus important to validate the MSPSS among caregivers of people with schizophrenia in China to better understand and measure their social support and guide for subsequent interventions.

The current study was conducted to test the psychometric properties of MSPSS among caregivers of people with schizophrenia in China. Specifically, we used both EFA and CFA to examine the internal consistency reliability, concurrent validity, and factor structure.

## Methods
### Participants

The study was conducted in Changsha City which lies in the central southern part of China. As the capital of Hunan Province, Changsha city is also the most populous city in Hunan with a population constituting of 11.82% of Hunan Province. Changsha City is one of the most developed and prosperous major cities in China with fast growing in its commercial, manufacturing, transportation, education and innovation. Data was obtained from the baseline assessment for a large community intervention program to implement a WeChat-based integrative family intervention (WIFI) for people living with schizophrenia and their families.[31] Family caregivers were recruited from 12 community health centers in Changsha city in Hunan Province through the "686 Program" – a community-based program to support the management and treatment of individuals with major mental disorders that is financed by the central government. The program provides free anti-psychotic medication for registered clients with a serious mental illness.[32] The inclusion criteria for family caregivers are as follows: 1) caring for a family member registered in the

"686 program" who meets criteria in the Chinese classification of Mental Disorders (CCMD-3) or the international classification of Schizophrenia (ICD-10) criteria for schizophrenia; 2) living with the care recipient for at least the last two years; 3) aged ≥18 years; and 4) able to read and communicate. Caregivers with obvious physical or mental illness and thus unable to communicate were excluded from the study sample. The sample size of 449 satisfies the factor analytic requirement of at least 10 respondents per item.[33]

## Procedure and Ethical Considerations

This cross-sectional study was conducted among family caregivers of people with schizophrenia in China from May 2019 to September 2019. Family caregivers were invited to participate in the study by a member of the research team during the monthly free medication clinic at their family member's community health center. The research team member explained the study purpose, procedures, potential risks and benefit of participation, prior to obtaining written informed consent. Upon receipt of written consent, each family caregiver participated in a face-to-face interview and also completed a survey questionnaire. Participants received the standard payment for research participation: 20 yuan (equivalent to $2.8) in cash. After 2 weeks, a random sample of 25 participants were retested using the same surveys to assess re-test reliability. The study was reviewed and approved by the Ethics Committee of the Xiangya School of Public Health, Central South University (No.: XYGW-2019-029).

## Measures
### Multidimensional Scale of Perceived Social Support (MSPSS)

MSPSS is a 12-item scale originally designed to assess social support from three different sources: family, friends, and significant others (ie, romantic, subordinate or other particularly close relationship).[34] Each subscale has four items and the total score ranges from 12 to 84, with higher scores indicating more social support. Respondents are asked to choose whether they agree with each statement on a 7-point Likert scale from 1 = "strongly disagree" to 7 = "strongly agree".[35] In the current study, the MSPSS showed good internal consistency, with a Cronbach's alpha of 0.95.

## Perceived Stress Scale (PSS)

PSS is a 10-item scale used to assess the degree of perceived stress within the past month.[36] It includes two domains: perceived distress (6 positive items) and perceived coping (4 negative items, reversely scored). Each item is rated on a 5-point Likert scale ranging from 0 (never) to 4 (very often). The total score ranges from 0 to 40, with higher scores indicative of greater perceived stress. In the current study, the PSS showed good internal consistency, with a Cronbach's alpha of 0.79.

## Adaptation, Partnership, Growth, Affection and Resolve (APGAR)

APGAR is a 5-item scale to assess perceived family functioning.[37] Each item is scored on a 3-point Likert scale from 0 (hardly ever) to 2 (almost always). The total score ranges from 0 to 10 with higher scores indicating higher satisfaction with family functioning. In the current study, the APGAR showed good internal consistency, with a Cronbach's alpha of 0.95.

## Simple Coping Style Questionnaire (SCSQ)

SCSQ[38] was first adapted from Folkman and Lazarus's most widely used Coping Style Questionnaire (CSQ) to facilitate its application in a Chinese context.[39] The 20-item scale covers two domains: active coping (12 items) and passive coping (8 items). Each item is scored on a 4-point Likert scale–from 0 (never) to 3 (always). The total score is calculated separately for positive and negative coping to assess coping tendencies and frequencies. In the current study, the SCSQ showed good internal consistency, with a Cronbach's alpha of 0.88.

## Caregiving Rewarding Feelings (CRF)

Positive feelings about caregiving were assessed using the Caregiving Rewarding Feelings (CRF) scale.[40] It consists of 12 items asking about a range of possible rewarding feelings during caregiving, such as "a better person" and "have a stronger sense of responsibility". Each item is rated on a 5-point Likert scale from 1 ("totally disagree") to 5 ("strongly agree") with higher total score indicating more positive feelings. In the current study, the CRF showed good reliability with a Cronbach's alpha of 0.96.

## Statistical Analyses

Data were analyzed using IBM SPSS Statistics 23.0 and Amos 22.0 software. Internal consistency reliability was assessed by the Cronbach's alpha coefficient, with a recommended level of 0.70 or above indicating good internal consistency.[41] Test–retest reliability was measured by the intraclass correlation coefficient (ICC) for the total score and kappa for each item, with a recommended level of ICC ≥0.70 and kappa ≥0.60, indicating good test–retest reliability.[42] Pearson correlation or Spearman's rank correlations was used to test the concurrent validity of the MSPSS depending on data normality distribution, with expected significant positive correlations with family functioning (measured by APGAR), positive coping style (measured by SCSQ) and positive feelings about caregiving (measured by CRF), as well as an expected negative correlation with perceived stress (measured by PSS).

Factor structure was tested first by EFA and then by CFA. EFA was employed to determine whether the MSPSS has a different factor structure than the a priori three-factor structure, while CFA was used to compare the new factor structure for the EFA (if any) and the a priori three-factor structure. Bartlett's test of sphericity[43] (measuring of sampling accuracy) and the Kaiser-Meyer-Olkin (KMO) test[44] (measuring sampling adequacy) were used to examine the appropriateness of the factor analysis. The following model fit indices were used as criteria for CFA: root mean square error of approximation (RMSEA; desired value <0.06), comparative fit index (CFI; desired value ≥0.90), normed fit index (NFI; desired value >0.95),[45] goodness-of-fit index (GFI; desired value ≥0.90), incremental fit index (IFI; desired value ≥0.90),[46] Tucker–Lewis index (TLI; desired value ≥0.90) and parsimony goodness-of-fit index (PGFI; desired value >0.50)[47]. P value <0.01 (two-tailed) was considered as statistically significant.

## Results

### Sample Characteristics

A total of 449 family caregivers completed the survey. The sample size satisfies the factor analytic requirement of at least 10 respondents per item.[33] Characteristics of participants are summarized in Table 1. Participants were 60.09 (SD:12.28) years old on average. Most were married or cohabiting (75.72%) and unemployed (85.52%). Over half were female (54.12%), parent caregivers (56.57%), and with

**Table 1** Characteristics of the Sample (N = 449)

| Variables | | M (SD)/N (%) |
|---|---|---|
| Age (years) | 18–59 | 169 (37.64) |
| | 60–100 | 280 (62.36) |
| District | Gaoxin | 57 (12.69) |
| | Furong | 116 (25.84) |
| | Kaifu | 157 (34.97) |
| | Tianxin | 119 (26.50) |
| Gender | Male | 206 (45.88) |
| | Female | 243 (54.12) |
| Occupation | Full-time | 41 (9.13) |
| | Part-time | 24 (5.35) |
| | Unemployed-homemaker | 139 (30.96) |
| | Unemployed-retired | 204 (45.43) |
| | Unemployed-else | 41 (9.13) |
| Education | Primary and below | 130 (28.95) |
| | Middle and high | 276 (61.47) |
| | College and above | 43 (9.58) |
| Marital Status | Single | 19 (4.20) |
| | Married/cohabited | 340 (75.72) |
| | Else (divorced/separated/ widowed) | 90 (20.08) |
| Income (RMB/ year) | 20,000 or less | 254 (56.57) |
| | 20,001–40,000 | 99 (22.05) |
| | 40,000 or greater | 96 (21.38) |
| Illness | Yes | 266 (59.24) |
| | No | 183 (40.76) |
| Kinship | Parents | 254 (56.57) |
| | Spouse | 106 (23.61) |
| | Children | 29 (6.46) |
| | Siblings | 49 (10.91) |
| | Other | 11 (2.45) |
| MSPSS | Total score | 50.35 (18.95) |
| | Family subscale | 18.04 (7.08) |
| | Friend subscale | 15.82 (7.13) |
| | Significant others subscale | 16.50 (6.86) |

**Table 2** Internal Consistency of the MSPSS and Its Three Subscales

| Scales | Cronbach's α | ICC (95% CI) |
|---|---|---|
| MSPSS Total | 0.95 | 0.91 (0.80–0.96) |
| MSPSS Family | 0.92 | 0.85 (0.67–0.94) |
| MSPSS Friends | 0.93 | 0.93 (0.83–0.97) |
| MSPSS Significant Others | 0.89 | 0.80 (0.54–0.91) |

some physical illnesses (59.24%). The total MSPSS score was moderately low with an average score of 50.35±18.95.

## Internal Consistency Reliability

As shown in Table 2, Cronbach's α coefficient was 0.95 for the total scale of MSPSS, 0.92 for the family subscale, 0.93 for the friend subscale, and 0.89 for the significant others subscale. ICC was 0.91 for the total scale of MSPSS, 0.85 for the family subscale, 0.93 for the friend subscale, and 0.80 for the significant others subscale. All these results indicate good internal consistency reliability.

## Test–Retest Reliability

The ICC for the total score was 0.91 (P < 0.001), exceeding the recommended standard of 0.70. Kappa for each item ranged from 0.62 for item 7 and 8 to 0.71 for item 9, exceeding the recommended standard of 0.60. All these results indicate good test–retest reliability.

## Concurrent Validity

Spearman's rank correlations were used for concurrent validity testing after normality testing showed non-normal distribution of MSPSS. Table 3 displays the correlations between MSPSS and PSS, CRF, APGAR, SCSQ. The total scale of the MSPSS was significantly negatively associated with the PSS (r =−0.221, P<0.01); and significantly positively associated with CRF (r = 0.535, P < 0.01), APGAR (r = 0.558, P < 0.01), and SCSQ (r =0.347, P < 0.01).

**Table 3** Correlations of MSPSS and Its Three Subscales with Other Variables (N=435)

| Variables | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| 1. MSPSS | 1 | | | | |
| 2. PSS | −0.221* | 1 | | | |
| 3. CRF | 0.535* | −0.327* | 1 | | |
| 4. APGAR | 0.558* | −0.306* | 0.656* | 1 | |
| 5. SCSQ | 0.347* | −0.022 | 0.450* | 0.324* | 1 |

**Note**: *P < 0.01.

## Exploratory Factor Analysis

The Kaiser–Meyer–Olkin (KMO) measure for the 12 items was 0.924, which is considered acceptable The Bartlett's test of sphericity had a significant level of p < 0.001, indicating a strong association among the variables. Therefore, the data were appropriate to proceed for EFA.

Although most earlier studies confirmed an a priori three-factor structure of the MSPSS, the EFA in this sample yielded only a two-factor solution. As shown in Table 4, factor 1 (eigenvalues = 7.71) accounted for 64.27% of the variance and included all items from the original subscales of significant others and friends. Factor 2 (eigenvalues = 1.17) accounted for 9.75% of the variance and included all items from the original family subscale. The combination of two factors accounted for 74.03% of the total variance.

## Confirmatory Factor Analysis

A CFA was conducted to test the a priori three-factor structure for the MSPSS and then compared with the new two-factor structure just obtained using the EFA. Table 5 shows a comparison of the model fit indices for between the two- and three-factor analyses. As is evident, the CFA generally supported the a priori three-factor structure, with all model fit indexes meeting the criteria except for the RMSEA (=0.10, exceeding the required criteria of <0.06). Also, the CFA did not support the new two-factor structure, with RMSEA, GFI, TLI, NFI not meeting the necessary criteria. Thus, the CFA showed better model fit for the a priori three-factor structure of the MSPSS than the two-factor structure obtained using EFA.

## Discussion

This study provides evidence of the reliability and validity of the Chinese version of the MSPSS among family caregivers of people with schizophrenia in China. Overall, the MSPSS shows good internal consistency and test–retest reliability. Concurrent validity was also supported by significant negative correlations with perceived stress, and significant positive correlations with caregiving rewarding feelings, family functioning, and coping. The EFA yielded a two-factor structure, but the CFA generally supported the a priori three-factor structure of the original scale.

Cronbach's alpha coefficients for the total scale and its three subscales exceeded 0.89, indicating high internal consistency of the MSPSS. This finding is consistent

**Table 4** Descriptive Statistics and Factor Loadings of the MSPSS (N=435)[†]

| Items | Mean (SD) | Factor Loadings | |
|---|---|---|---|
| | | Factor 1[‡] | Factor 2[§] |
| 1. There is a special person who is around when I am in need. | 4.10 (2.01) | **0.642** | 0.371 |
| 2. There is a special person with whom I can share my joys and sorrows. | 4.07 (1.98) | **0.675** | 0.431 |
| 5. I have a special person who is real source of comfort. | 4.15 (1.98) | **0.697** | 0.482 |
| 6. My friends really try to help me. | 3.91 (1.96) | **0.847** | 0.302 |
| 7. I can count on my friends when things go wrong. | 3.76 (1.95) | **0.826** | 0.284 |
| 9. I have friends with whom I can share my joys and sorrows. | 4.09 (1.99) | **0.834** | 0.288 |
| 10. There is a special person in my life who cares about my feelings. | 4.17 (1.93) | **0.719** | 0.418 |
| 12. I can talk about my problems with my friends. | 4.06 (1.95) | **0.826** | 0.254 |
| 3. My family really tries to help me. | 4.43 (2.00) | 0.319 | **0.848** |
| 4. I get the emotional help and support I need from my family. | 4.56 (1.96) | 0.316 | **0.877** |
| 8. I can talk about my problems with my family. | 4.49 (1.95) | 0.351 | **0.791** |
| 11. My family is willing to help me make decisions.<br>Initial Eigenvalues<br>Explained variance (%) | 4.56 (1.99) | 0.347<br>7.713<br>64.273 | **0.791**<br>1.170<br>9.753 |

**Notes:** [†]Bold values: factor loadings >0.60, [‡]non-family support, [§]family support.

with previous studies showing high Cronbach's alpha coefficients.[11,12,48] For instance, Wittenborn's study among individuals in prison in the US reported a Cronbach's alpha coefficient of 0.93 for the total MSPSS, and Zhou's study among a Chinese population with methadone maintenance treatment reported a Cronbach's alpha coefficient of 0.92. The ICC of the total score and the weighted kappa for each item were also above the recommended, showing high test–retest reliability. This finding is also consistent with other studies showing similar results.[49–51] This finding indicates the stability of the MSPSS in assessing social support over time. However, future research should examine test–retest reliability with a larger sample.

The MSPSS also showed significant negative correlations with PSS, and significant positive correlations with CRF, APGAR, and CSCQ, demonstrating favorable concurrent validity. The results are in keeping with previous studies showing similar results. For instance, social support has been reported to be negatively associated with perceived stress with a correlation coefficient of 0.458 in Lohanan's study,[52] and positively associated with positive coping with a correlation coefficient of 0.21 in Lin, J's study.[53] This finding illustrates that the MSPSS aligns with the key functions of social support in buffering stress, facilitating positive coping, improving family functioning, and instilling positive feelings among caregivers. However, only mild correlation was found for PSS and

**Table 5** Summary of Model Fit Statistics from Confirmatory Factor Analysis for the MSPSS Factorial Structure[¶]

| Model | $\chi^2$/df | P | CFI | GFI | IFI | RMSEA | TLI | NFI | PGFI |
|---|---|---|---|---|---|---|---|---|---|
| Criteria | | | ≥ 0.90 | ≥ 0.90 | ≥0.90 | < 0.06 | ≥0.90 | ≥0.95 | ≥0.50 |
| Two-factor model | 3.51 | <0.001 | 0.92 | 0.82 | 0.92 | 0.13 | 0.89 | 0.89 | 0.53 |
| Three-factor model | 5.45 | <0.001 | 0.96 | 0.91 | 0.96 | 0.10 | 0.94 | 0.95 | 0.56 |

**Notes**: [¶]Two-factor model: family and non-family; three-factor model: family, friends, and significant others.
**Abbreviations**: $\chi^2$/df, Ratio of chi-square to degrees of freedom; CFI, comparative fit index; GFI, goodness of fit index; IFI, adjusted goodness of fit index; RMSEA, root mean square error of approximation; TLI, Tucker-Lewis index; NFI, normed fit index; PGFI, Parsimonious-fit index.

SCSQ, and moderate correlation for CRF and APGAR with MSPSS, indicating that other factors may mediate such correlations, which warrants further study.

Different factor structures were supported by the use of different methods, with EFA yielding a two-factor structure and CFA a three-factor structure. In the EFA, the original family subscale was retained as one factor, while the original subscales of friends and significant others were combined into a single "non-family subscale." This finding is consistent with some previous research that has found a "Significant Others" scale and "Friends" scale as one factor.[13,48] The specific sample characteristics and socio-cultural factors of the study sample may have accounted for these effects. Most caregivers in this study were married and unemployed, thus likely engaged mostly in-home care with fewer social contacts outside of the home. In addition, because of the significant time and energy required to care for their family members with schizophrenia, caregivers may have had little time to obtain social support from individuals outside of their family, such as friends, neighbors, and co-workers (since most were unemployed). For these in-home family caregivers, social support sources may be more limited and can be thus more readily classified as family and non-family.

Another factor that could have accounted for these results may have been cultural. The Chinese culture is dominated by Confucian values that attach great importance to familism.[54] Family constitutes the basic unit in the Chinese social structure and plays an essential role in every family member's life. All social contacts outside the family are likely to be seen in a similar light as "not in the family."

In contrast, the CFA showed better model fit for the three-factor structure, which is consistent with most previous studies with other samples also using CFA. Thus, the CFA supported the original theory underlying the creation of the MSPSS that there are three dimensions of social support.[34] The discrepancy between EFA and CFA further suggests that the factors may be method-dependent, thereby recommending caution when choosing the appropriate analytic method to yield a factor structure that best fits the theoretical model of interest.[21] This finding shows that there is a lack of agreement about the underlying factor structure of the MSPSS.

There were some limitations to note. First, the sample in the current study was recruited from 12 communities in Changsha city in China, and thus may not be completely generalizable to other families and countries. Second, except for the test–retest assessment, the study was cross-sectional and thus the sensitivity of the measures to change could not be ascertained. And finally, the test–retest reliability was based on a relatively small sample.

## Conclusions

The MSPSS is a valid instrument with adequate psychometric properties and can be reliably used to assess perceived social support among family caregivers of people with schizophrenia. Its factors may be method-dependent, with EFA yielding a two-factor structure and CFA more consistent with the original scales a priori three-factor structure. Our study indicates that there is no unified standard on the dimensions of the MSPSS; thus, it is necessary to choose the factor structure that best fits the theoretical model at hand.

## Ethical Approval

Ethical approval was obtained from the Institutional Review Committee of the Xiangya School of Public Health of Central South University (No.: XYGW-2019-029). All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from all individual participants included in the study.

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## Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and

interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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## Disclosure

The authors report no conflicts of interest in this work.

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